The main research activity of the department ELEC at the Vrije Universiteit Brussel is the development of new measurement techniques using advanced signal processing methods, embedded in an identification framework. When we make a measurement, we have to make a number of decisions: firstly a model for the considered part of reality is proposed (e.g. for a resistance measurement Ohm's law can be selected); next a number of measurements is made (e.g. a number of current and voltage measurements); finally the quantities of interest are extracted from these measurements by matching the model to the data. Often an intuitive approach is used. However, in the presence of measurement errors this can lead to a very poor and even dangerous behavior: the user wouldn't remark that something is going seriously wrong. This is the major motivation for the development of the identification theory. It offers a systematic approach to 'optimally' fit mathematical models to experimental data, eliminating stochastic distortions as much as possible. As such it can be considered as the modern formulation of the measurement problem, and for that reason the identification approach is the "file rouge" in most of the activities of the department.

At this moment we deal with a very wide scope of application fields:

- Systems covering the frequency range from a few mHz up to 50 GHz,
- Linear systems and non-linear systems,
- Lumped systems and distributed systems.

We applied the measurement and modeling techniques to the identification of electrical, mechanical vibrating, electronic circuits and filters, distributed systems, microwave applications. Since a few years we apply those methods also to the analysis of biological samples used as records of global climate change. For some of these applications the efforts are focused on the development of new measurement instruments, for others we focused completely on the development of new data processing and modeling techniques, or even worked on the underlying fundamental theoretical aspects.